

# POLLEN LOADS OF VERTEBRATES IN HEATH VEGETATION DURING AUTUMN AT ENEABBA

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## INTRODUCTION

Many plant species occurring in the sandplains, or kwongan, are believed to be vertebrate-pollinated. As part of an investigation into the reproductive biology of selected *Banksia* species (Barrett, 1985), trapping of vertebrates was conducted during May 1984. The pollen load of each animal was recorded and faecal samples were also examined for pollen. Some conclusions were drawn about the likely importance of the various vertebrates as pollinators.

## MATERIALS AND METHODS

Trapping was conducted on May 7–11, 1984, in *Banksia* heath on yellow sand over laterite 5 km south of Eneabba (29°52'S, 115°16'E). *Banksia candolleana* was the most common plant species in flower with flowers of *B. grossa*, *B. hookerana*, *B. menziesii*, *Calothamnus sanguineus*, *Lambertia multiflora* and *Verticordia grandis* also available to potential pollinators.

Vertebrates were either mistnetted (birds) or trapped in pit traps or Elliot traps (mammals). Netting was conducted during the first two hours after first light and the last

two hours before sunset. Inverted 'witches hats' were used as pit traps and were placed at 3 m intervals along a 40 m x 30 cm aluminium wire drift fence. Elliot traps were baited with a honey/peanut butter/rolled oats mixture.

Pollen samples were collected from the head and bill of each bird and the head and snout of each mammal using the method described by Wooller *et al.* (1983), modified to include the stain devised by Alexander (1980). Faecal samples were obtained, where possible, by placing captive animals inside a paper bag until a sample was produced. If no sample was produced within fifteen minutes, the animal was released. The samples were checked for the presence of pollen.

A qualitative assessment of nectar availability (negligible, moderate, copious) in *B. candolleana* was also made by inspecting five tagged inflorescences every two hours over a 24 hour period.

## RESULTS

Three species of bird and four species of mammal, and a total of thirty-eight individuals, were trapped. The mean pollen load recorded for each species is shown

Table 1. Mean pollen loads on birds and mammals near Eneabba in May 1984.

Species	n	Banksia candolleana	Banksia grossa	Banksia hookerana	Banksia menziesii	Calothamnus sanguineus	Lambertia multiflora	Verticordia grandis
Brown Honeyeater ( <i>Lichmera indistincta</i> )	9	20±40	-	-	-	252±223	-	30+86
Tawny-crowned Honeyeater ( <i>Phylidonyris melanops</i> )	7	35±48	2±5	-	6±8	322±545	-	-
White-cheeked Honeyeater ( <i>Phylidonyris novaehollandiae</i> )	9	138±111	48±148	131±291	71±161	775±916	22±67	15+26
House Mouse ( <i>Mus musculus</i> )	5	23±38	-	-	-	-	-	-
Ashy-grey Mouse ( <i>Pseudomys albocinereus</i> )	3	9±16	-	-	-	-	-	-
Honey Possum ( <i>Tarsipes rostratus</i> )	4	241±292	-	-	-	9±18	-	-
Dunnart ( <i>Sminthopsis</i> sp.)	1	18	32	-	-	-	-	-

in Table 1. White-cheeked Honeyeaters (*Phylidonyris nigra*) carried the most pollen – mostly from *C. sanguineus* and *B. candolleana*. The other bird species – Brown Honeyeater (*Lichmera indistincta*) and Tawny-crowned Honeyeater (*P. melanops*) – generally carried less pollen but almost all birds had pollen of *C. sanguineus*. The Honey Possum (*Tarsipes rostratus*) carried pollen of *B. candolleana* as did some of the rodents. Two of the five individuals of House Mouse (*Mus musculus*) and one of three individuals of the Ashy-grey Mouse (*Pseudomys albocinereus*) has small pollen loads of *B. candolleana*, together with the single dunnart (*Sminthopsis* sp.).

Twenty faecal samples were obtained with eight containing

pollen of at least one species (Table 2). The main component of almost all samples was arthropod segments although they were not recorded in the faeces of an Ashy-grey Mouse (*P. albocinereus*). Of those samples containing pollen, each contained pollen of *B. candolleana*. The amounts of pollen in faeces were not quantified but comprised a low proportion of the overall sample in each case.

Two peaks of nectar availability in *B. candolleana* were observed. There were copious amounts of nectar available from the predawn period (0400 hours) until mid-morning and again in the early evening (2000 hours). Some nectar was available at all other times except for early to late afternoon (1400–1800 hours). A 'musty' odour was apparent at all times.

Table 2. Arthropod segments and pollen recorded in faecal samples of birds and mammals near Enceabba in May 1984.

Species	n	Arthropod segments	Pollen				
			<i>Banksia candolleana</i>	<i>Banksia grossa</i>	<i>Banksia hookerana</i>	<i>Calothamnus sanguineus</i>	<i>Verticordia grandis</i>
Brown Honeyeater ( <i>Lichmera indistincta</i> )	4	4	2	–	1	1	1
Tawny-crowned Honeyeater ( <i>Phylidonyris melanops</i> )	5	5	–	–	–	–	–
White-cheeked Honeyeater ( <i>Phylidonyris nigra</i> )	7	7	3	1	–	–	–
House Mouse ( <i>Mus musculus</i> )	2	2	2	–	–	2	2
Ashy-grey Mouse ( <i>Pseudomys albocinereus</i> )	1	–	1	–	–	1	1
Dunnart ( <i>Sminthopsis</i> sp.)	1	1	–	–	–	–	–

## DISCUSSION

The data suggest that each of the three bird species sampled in this study play a role in the pollination of *Calothamnus sanguineus*. White-cheeked Honeyeaters carried pollen of all seven plant species in flower and is probably also an important pollinator of *Banksia candolleana*. The occurrence of small amounts of pollen in some faecal samples can be attributed to accidental ingestion rather than any active consumption (Paton, 1981).

The mean pollen loads for *B. candolleana* were greatest on the Honey possum (*T. rostratus*). Given their diet of pollen and nectar, the Honey Possum is likely to play a significant role in the pollination of *B. candolleana*. The dual peaks in nectar availability suggest an adaptation for both bird and mammal pollination.

The occurrence of small amounts of pollen on the rodents and the dunnart was unexpected. Care was taken during the sampling process to avoid any 'contamination' with pollen. *Pseudomys*, however, have been recorded eating flowers (C.H.S. Watts, pers. comm.) and so could be expected to accumulate some pollen on the body and in faeces. Pollen has also been recorded on the House mouse (*M. musculus*) previously (D. Kitchener, pers. comm.).

The common occurrence of insects and their larvae in *Banksia* inflorescences (Scott, 1982) may also attract rodents and dunnarts in the pursuit of which they may accumulate pollen. Pollen in *Banksia* in particular can occur in

high ambient levels. In *B. candolleana* each flower carries a mean number of pollen grains of approximately 12,000 with around 450 flowers on each inflorescence (Barrett, unpub. data). The volume of pollen carried and the apparent nature of their attraction to inflorescences, however, suggest they are unlikely to play any significant role in pollination.

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